



**HAL**  
open science

## Plastic debris dataset on the Seine river banks: plastic pellets, unidentified plastic fragments and plastic sticks are the Top 3 items in a historical accumulation of plastics

Romain Tramoy, Laurent Colasse, Johnny Gasperi, Bruno Tassin

### ► To cite this version:

Romain Tramoy, Laurent Colasse, Johnny Gasperi, Bruno Tassin. Plastic debris dataset on the Seine river banks: plastic pellets, unidentified plastic fragments and plastic sticks are the Top 3 items in a historical accumulation of plastics. Data in Brief, 2019, 10.1016/j.dib.2019.01.045 . hal-01992196

**HAL Id: hal-01992196**

**<https://enpc.hal.science/hal-01992196v1>**

Submitted on 16 Jan 2024

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Contents lists available at ScienceDirect

## Data in Brief

journal homepage: [www.elsevier.com/locate/dib](http://www.elsevier.com/locate/dib)



### Data Article

# Plastic debris dataset on the Seine river banks: Plastic pellets, unidentified plastic fragments and plastic sticks are the Top 3 items in a historical accumulation of plastics



Romain Tramoy<sup>a,\*</sup>, Laurent Colasse<sup>b</sup>, Johnny Gasperi<sup>a</sup>,  
Bruno Tassin<sup>a</sup>

<sup>a</sup> LEESU (UMR MA 102, University of Paris-Est, AgroParisTech), University of Paris-Est Créteil, 61 avenue du Général de Gaulle, 94010 Créteil Cedex, France

<sup>b</sup> SOS Mal de Seine NGO, France

#### ARTICLE INFO

##### Article history:

Received 17 December 2018

Received in revised form

10 January 2019

Accepted 18 January 2019

#### ABSTRACT

Plastic pollution in oceans and rivers is of high concern because of its persistence in the environment and its potential impact on ecosystems. However, there is a specific lack of data in rivers. Here we present data from the Seine river banks in a historical polluted shore. Data were classified using international MSFD and OSPAR classifications. The sampled site is a quadrat of 1 m<sup>2</sup> located downstream in the estuary in a visual maximum along a 1 km shore covered by plastics. A total of 20,259 plastic debris were individually counted, classified and weighted by category for a total mass higher than 4 kg. Half of the plastic debris in number are represented by preproduction pellets.

© 2019 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

\* Corresponding author.

E-mail addresses: [romain.tramoy@enpc.fr](mailto:romain.tramoy@enpc.fr) (R. Tramoy), [johnny.gasperi@u-pec.fr](mailto:johnny.gasperi@u-pec.fr) (J. Gasperi), [bruno.tassin@enpc.fr](mailto:bruno.tassin@enpc.fr) (B. Tassin).

## Specifications table

|                            |   |
|----------------------------|---|
| Subject area               | <i>Environment</i>  |
| More specific subject area | <i>Plastic pollution</i>  |
| Type of data               | <i>Table, figure</i>  |
| How data was acquired      | <i>Hand collection, visual and chemical identification</i>  |
| Data format                | <i>analyzed</i>   |
| Experimental factors       | <i>Air-dried and sorted with the naked eye</i>  |
| Experimental features      | <i>Sampling and sorting</i>   |
| Data source location       | <i>Seine estuary, Petiville, France, Lat. 49.4339; Long. 0.6160</i>   |
| Data accessibility         | <i>Data in this article</i>   |
| Related research article   | <i>A. Bruge C. Barreau, J. Carlot, H. Collin, C. Moreno and P. Maison, Monitoring Litter Inputs from the Adour River (Southwest France) to the Marine Environment, J. Mar. Sci. Eng., 6 (2018) 24–36. <a href="https://doi.org/10.3390/jmse6010024">10.3390/jmse6010024</a></i> |

## Value of the Data

- Identified plastic items in river banks according to litter international classifications (MSFD and OSPAR) for comparisons with marine data.
- Reporting items in number, mass and volume for conversions between units in other studies dealing with plastic litter in rivers.
- The amount of plastic preproduction pellets is reported at levels never reported before.
- New types of items identified: fibers from toilet brushes, plastic tag ties, plastic fragments from road brushes.
- Need to adapt the OSPAR/MSFD classifications used for the marine environment to rivers.

## 1. Data

In this report, an inventory of plastic items is presented (Table 1). Plastic items were collected in a quadrat of 1 m<sup>2</sup> in a historical polluted shore in the Seine river (downstream of the estuary; Lat. 49.4339; Long. 0.6160). Data are representative of the historical plastic pollution occurring in this river with few items dated from 1965, 1974, 1983, 1992 or 2010. Plastic items were classified according to OSPAR and MSFD classifications, which give insights about the origin of the items and their chemical composition.

A total of 20,259 plastic debris were individually counted, classified and weighted by category. Those plastic debris are more than 150% heavier in mass (> 4 kg) than organic debris, i.e. dead vegetation and gastropod shells, found in this kind of dry march surrounded by reedbeds.

The Top 3 categories of items collected are plastic preproduction pellets [2], unidentified plastic fragments and plastic sticks (cotton bud and lollipop sticks; [1]. Plastic preproduction pellets are 15 times more numerous than gastropod shells. High concentration of pellets could be linked to the vicinity of plastic manufacturers near the sampled site. They represent 50% of the items collected during this campaign but only 5.6% of the mass (Fig. 1). In contrast, around 30% of the mass is carried by the unidentified fragments of macroplastics > 2.5 cm, which only represent 7% of the total items. Hundreds of caps, lids, and rings were also found without their associated bottles, which are often prompt to sink. Furthermore, the dataset refers to specific activities in the estuary with for example 100 g/m<sup>2</sup> of polyethylene from shotgun plastic wads related to intense hunting activities. Those items have to be mentioned because they are very common in the estuary and their origin is clearly identified, while alternatives such as biodegradable wads do exist.

Reporting number of items, associated mass and volumes will improve conversions of unit for other studies related to river pollution when only one of the units are available. To facilitate

**Table 1**

Inventory of plastic items collected in 1 m<sup>2</sup> on a river bank in the Seine river at Petiville. In yellow, items of special interest for their high recurrence or their novelty.

| MFD                       | OSPAR | Items  | Full | Micro (<0.5 cm) | Meso (0.5-2.5 cm) | Macro (>2.5 cm) | Total | Dry mass (g) | Vol. (L) | Comment  |                                   |
|---------------------------|-------|--|------|-----------------|-------------------|-----------------|-------|--------------|----------|--|-----------------------------------|
| <b>Synthetic polymers</b> |       |  |      |                 |                   |                 |       |              |          |  |                                   |
| G3                        | 2     | Bags (e.g. shopping)   |      |                 |                   | 7               | 7     | 19.7         |          | Handles in hard plastic. Bags were probably fragmented |                                   |
| G10                       | 6     | Food incl. fast food containers in <b>expanded polystyrene</b>                   |      |                 |                   | 106             | 106   | 22.0         | 0.3      | By decreasing order : kebab, Mac Donald, meat          |                                   |
|                           |       | Food incl. fast food containers in other plastics                                |      |                 |                   | 3               | 3     | 7.8          |          |  |                                   |
| G12                       | 7     | Cosmetics (bottles & containers e.g. sun lotion, shampoo, shower gel, deodorant) | 8    |                 |                   |                 | 8     | 15.5         |          | 4 mini-parfume, 2 lipsticks, 2 nail polish             |                                   |
| G13                       | 12    | Other containing in plastics other than polystyrene                              |      |                 |                   | 20              | 20    | 14.2         |          |  |                                   |
| G17                       | 11    | Injection gun containers   |      |                 |                   | 3               | 3     | 3.1          |          |  |                                   |
| G18                       | 13    | Crates (except fishing activities)   |      |                 |                   | 1               | 1     | 6.5          |          |  |                                   |
| G19                       | 14    | Car parts  | 12   |                 |                   | 7               | 19    | 98.5         | 0.2      | Include wheel arch screw                               |                                   |
| G21                       |       | Caps/lids: drinks  | 187  |                 | 1                 | 13              | 201   | 89.9         | 2        |  |                                   |
| G22                       |       | Caps/lids: non-food product (chemical, cosmetic)                                 | 25   |                 |                   |                 | 25    | 69.2         | 0.3      | e.g 4 dishwashing liquid, 3 oil, 2 toothpastes         |                                   |
| G23                       |       | Caps/lids: unidentified  | 145  |                 | 2                 | 25              | 172   | 205.6        | 1.1      |  |                                   |
| G24                       |       | Caps/lids: rings and associated seal   | 231  |                 | 27                | 127             | 385   | 139.7        | 1.1      |  |                                   |
| G25                       |       | Tobacco: packaging and associated plastic films                                  |      |                 |                   | 1               | 1     | 1.3          |          |  |                                   |
| G26                       |       | Tobacco: lighter   | 3    |                 |                   |                 | 3     | 33.8         | 0.1      |  |                                   |
| G27                       | 64    | Tobacco: cigarette butts   | 41   |                 |                   |                 | 41    | 22.3         | 0.1      | Plastic tips   |                                   |
| G28                       | 17    | Pens and related   | 65   |                 |                   |                 | 65    | 69.9         | 0.2      | Include 34 caps, 12 cartridge, 4 pens                  |                                   |
| G30                       | 19    | Crisp/sweet packets  | 5    |                 |                   |                 | 83    | 88           | 57       | 0.5  | 49 packaging, 29 pieces of Kinder |

|      |     |   |           |  |      |      |           |             |            |  |
|------|-----|---|-----------|--|------|------|-----------|-------------|------------|--|
| G31  |     | Lollipop sticks   | 86        |  | 30   | 117  | 159       | 73          | 0.3        | 159 adding reconstituted pieces with 233 fragments   |
| G32  | 20  | Toys & party poppers  | 47        |  |      | 19   | 66        | 65.4        | 0.2        | Including a plastic coin of 1/2 Franc from 1965!?    |
| G33  | 21  | Cups in expanded polystyrene  |           |  |      | 2    | 2         | 4           |            |  |
| G34  | 22  | Tableware: cutlery and dishes   | 2         |  |      | 1    | 3         | 14.1        |            |  |
| G35  |     | Tableware: straws and blender   |           |  | 2    | 2    | 4         | 0.5         |            |  |
| G66  | 39  | Strapping bands   | 5         |  | 11   | 17   | 33        | 24.4        |            | Include 5 corner reinforcements                      |
| G67  | 40  | Plastic sheeting: agricultural  |           |  |      | 1    | 1         | 55          | 0.1        |  |
|      |     | Industrial packaging  | 1         |  | 106  | 86   | 193       | 28.5        | 0.1        | 2400 cm2   |
| G70  | 43  | <b>Shotgun cartridges (plastic wad)</b>                                       | <b>48</b> |  |      |      | <b>48</b> | <b>97.1</b> | <b>0.3</b> | <b>Include 42 plastic wads and 6 plastic washers</b> |
|      |     | Foam sponge: flexible   |           |  | 19   | 15   | 34        | 4.2         | 0.1        | Polyethylene foam                                    |
| G73  | 45  | Foam sponge: hard yellow/brown (isolation)                                    |           |  | 39   | 24   | 63        | 18.2        | 0.2        | Polyurethane foam in aerosol                         |
|      |     | Foam sponge: hard blue/white/grey (isolation)                                 |           |  | 18   | 8    | 26        | 2           |            | Polystyrene extruded foam                            |
| G78  | 117 | Unidentified fragment: plastic (0-2.5 cm)                                     |           |  | 3612 |      | 3612      | 333         | 0.9        |  |
| G79  | 46  | Unidentified fragment: plastic (2.5-50 cm)                                    |           |  |      | 1503 | 1503      | 1263.3      | 5          |  |
| G81  | 117 | Unidentified fragment: expanded polystyrene (0 - 2.5 cm)                      |           |  | 1114 |      | 1114      | 35.6        | 0.5        |  |
|      |     | Unidentified fragment: no molded and flat in expanded polystyrene (2.5-50cm)  |           |  |      | 107  | 107       | 12.6        | 0.2        |  |
| G82  | 46  | Unidentified fragment: molded and not flat in expanded polystyrene (2.5-50cm) |           |  |      | 278  | 278       | 71          | 1.5        |  |
| G89  | 48  | Construction: flat plastic (PVC, tiled crosspiece)                            | 38        |  |      | 25   | 63        | 143.1       | 0.3        | e.g 34 fragments of PVC? 21 tile spacers             |
|      |     | Construction: tubes (incl. electric sheath)                                   |           |  | 5    | 24   | 29        | 9.5         |            | e.g 8 macro, 16 electric sheath                      |
| G90  | 48  | Flower pot  |           |  |      | 11   | 11        | 14.2        |            |  |
| G91  | 48  | Biomedica from water treatment plant  | 11        |  |      | 1    | 12        | 1.9         |            | Leaks from EVRY station in 2010?                     |
| G93  | 48  | Cable ties  |           |  |      | 3    | 3         |             |            |  |
| G95  | 98  | Sanitary: cotton bud  | 326       |  | 566  | 380  | 693       | 131.2       | 0.6        | Include reconstituted items with 1272 fragments      |
| G96  | 99  | Sanitary: sanitary napkin, party liners                                       | 10        |  | 4    |      | 14        | 32.9        | 0.2        | Include 10 tampon applicators ≠ G144!                |
| G97  | 101 | Sanitary: bloc WC   |           |  |      | 6    | 6         | 11.1        |            |  |
| G99  | 104 | Medical: syringe, needle  | 7         |  | 2    | 6    | 15        | 19.7        | 0.1        | (majority of insulin syringe)                        |
| G100 | 103 | Medical: medicines  | 17        |  | 14   | 1    | 32        | 51          | 0.2        | Include 10 single doses                              |
|      |     | Sanitary: ear plug  | 1         |  |      |      | 1         | 0.6         |            |  |
|      |     | Sanitary: toothbrush  |           |  |      | 1    | 1         | 2.6         |            |  |
|      |     | Sanitary: razor   |           |  |      | 8    | 8         | 13.6        |            | Wilkinson  |
|      |     | Child's pacifier  |           |  |      | 2    | 2         | 6.2         |            |  |
|      |     | Stichespin  |           |  | 1    | 9    | 10        | 12.2        |            |  |
| G124 | 48  | Packaging: thin packaging/other film (incl. cellophane, tissue pack...)       |           |  |      | 23   | 23        | 2.9         |            |  |
|      |     | Packaging: chips and spaghetti padding in expanded polystyrene                | 2         |  |      |      | 2         | 0.2         |            |  |

Table 1 (continued)

|   |     |   |             |              |             |             |              |             |   |   |
|---|-----|---|-------------|--------------|-------------|-------------|--------------|-------------|---|---|
|   |     | Stamp (plastic): (drinks)   |             |              | 1           | 1           | 0.5          |             |   |   |
|   |     | Stamp (plastic): other  | 1           |              |             | 1           | 0.5          |             |   |   |
|   |     | Sealed  |             |              | 19          | 19          | 23.7         | 0.1         | Tampon  |   |
|   |     | Maintenance/bricolage: various equipment (broom, shovel, brush, etc...) | 47          |              |             | 47          | 74           | 0.1         | e.g. 13 security seals, 1 EDF seal from 1974              |   |
|   |     | Plastic flowers   | 5           |              | 4           | 15          | 24           | 11.3        | e.g. 10 screw cover, 10 washers, 6 plastic welding sticks |   |
|   |     | Melted plastic  |             |              | 60          | 42          | 102          | 176.4       | 0.3   | Include 2 feke cakes                                |
|   |     | Plastic fibers Ø<1 mm   |             |              |             | 132         | 132          | 1           |   | From toilet brushes?                                |
|   |     | Plastic tag ties  | 13          |              |             | 192         | 205          | 24.7        |   |   |
|   |     | Synthetic road broom  |             |              | 26          | 95          | 121          | 24.4        |   | Different colors. Recurrent in the Seine river      |
|   |     | Key ring  | 2           |              |             | 2           | 6.6          |             |   | Including a phone number used between 1963 and 1985 |
|   |     | Condenser-like item   | 1           |              |             | 1           | 66.6         |             |   |   |
|   |     | Berlingots for liquids  | 3           |              |             | 12          | 15           | 9.3         |   |   |
|   |     | Geogrids and grids  |             |              |             | 17          | 17           | 6.2         |   |   |
|   |     | Adhesive tape   |             |              |             | 8           | 8            | 8.6         |   |   |
|   |     | Filter pump from water treatment plant                                  | 1           |              |             | 1           | 45           | 0.1         |   |   |
|   |     | Plastic wheel   | 4           |              |             | 4           | 19.4         |             |   |   |
|   |     | Preproduction pellets   |             | 10240        |             |             | 10240        | 256.0       | 0.5   | Plastic manufacturers close to the sample site      |
| <b>TOTAL OF SYNTHETIC POLYMERS (PLASTICS)</b> |     |   | <b>1400</b> | <b>10240</b> | <b>5663</b> | <b>3609</b> | <b>20259</b> | <b>4181</b> | <b>17.5</b>   |   |
| <b>Rubber</b>                                 |     |   |             |              |             |             |              |             |   |   |
| G125  | 49  | Balloon of bladder: incl. plastic valve, ribbon, string, stick,...      |             |              |             | 9           | 9            | 3.5         |   |   |
| G126  | 53  | Other balloons  | 3           |              |             | 2           | 5            | 62.7        |   | Yellowish and blackish                              |
| G134  | 53  | Unidentified rubber fragments   |             |              |             | 11          | 11           | 17.7        |   |   |
|   |     | Other items   | 1           |              |             | 1           | 2            | 68.9        |   | 1 sole and 1 strap                                  |
| <b>Manufactured wood</b>                      |     |   |             |              |             |             |              |             |   |   |
| G159  | 68  | Cork cap  | 2           |              |             | 2           | 2            | 8.3         |   |   |
| G171  | 74  | Unidentified wood fragments < 50cm                                      |             |              | 2           | 1           | 3            | 13          |   | Corkwood  |
| <b>Metals</b>                                 |     |   |             |              |             |             |              |             |   |   |
| G177  | 81  | Packaging: aluminum foil  |             |              |             | 3           | 3            | 16          |   |   |
| G178  | 77  | Cap: incl. bobbin pull, wirehood  | 2           |              |             | 2           | 2            | 4.4         |   |   |
| <b>Other</b>                                  |     |   |             |              |             |             |              |             |   |   |
| G211  | 105 | Medics : injectable dose  | 1           |              |             | 1           | 1            | 5.6         |   | Used dose   |
| G213  | 109 | Paraffin / wax (1-10 cm)  |             |              | 1           | 2           | 3            | 8.9         |   |   |
|   |     | Wax : candle  |             |              | 2           | 2           | 2            | 5.2         |   |   |
| /   | 111 | Red/brown Pouzollane  |             |              | 230         | 36          | 266          | 292         | 0.8   | Density <1. Historical foundry waste?               |
| /   | 111 | White pumice stone  |             |              | 3           | 4           | 7            | 60.8        | 0.1   | Unknown origin                                      |
| /   | 111 | Red/brown clay beads  | 83          |              |             | 83          | 83           | 58.2        | 0.1   | Gardening   |
| /   | 111 | Lightweight concrete  |             |              | 1           | 1           | 2            | 7.8         | 0.1   | Construction  |
| <b>BIODIVERSITY</b>                           |     |   |             |              |             |             |              |             |   |   |
|   |     | Earth worms (alive)   |             |              |             |             | 21           |             |   |   |
|   |     | Gastropod shells  | 655         |              |             |             | 655          | 261         | 1.2   |   |
|   |     | Dead wood   |             |              |             |             |              | 2400        | 23  |   |

conversions, mass per item were also reported for the Top 10 items (Fig. 1). In addition, specific items such as plastic tag ties (e.g. textile), or plastic fibers from toilet brushes were unusually reported and should be considered as additional categories in OSPAR/MSFD classifications for rivers.

## 2. Experimental design, materials, and methods

### 2.1. Experimental design

#### 2.1.1. Site description

Plastic litter were collected in the estuary of the Seine river close to Petiville, 80 km downstream of Rouen and 30 km upstream the river mouth (Fig. 2). Here is the beginning of the muddy plug of the estuary under high tidal influence. The sampled site belongs to a 1 km shore covered by plastic litter and corresponds to a visual maximum of plastic accumulation on a gentle slope dipping to the river. The depositional environment is a dried marsh annually flooded by the river and entrapped by a road on north-side (ancient towpath) and reedbeds on south-side. In this environment, woody debris and gastropod shells are very common. However, plastic debris also accumulate. They are not easily removed by flood events because reedbeds act as a barrier living floating items go in but not out. Very large items are less frequent thanks to this natural barrier and because of punctual cleanings by NGO's.

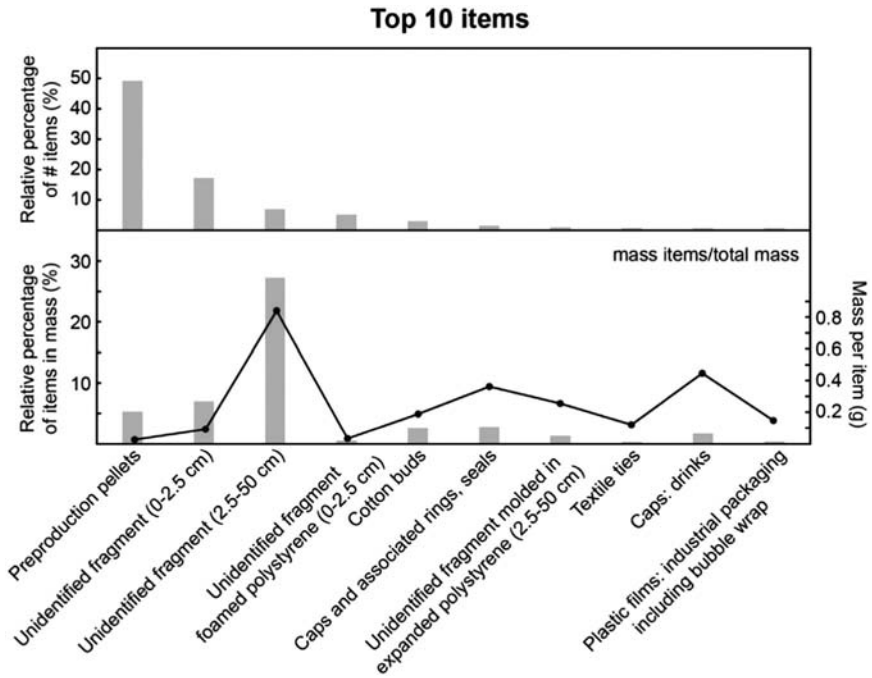


Fig. 1. Top 10 plastic items collected in 1 m<sup>2</sup> on a river bank in the Seine river at Petiville. The black line refers to the mass per unit



Fig. 2. Geographical localization of the sampled site. Notice that plastic producers from Notre-Dame-de-Gravenchon are close to the targeted site. Lat. 49.4339; Long. 0.6160. The red stars point to the major plastic manufacturers, i.e. main sources of preproduction pellets.

### 2.1.2. Sampling method

Plastic litter and organics (wood and organisms, mostly dead gastropod shells) were exhaustively collected by hands in a quadrat of 1 m<sup>2</sup> in a visual maximum of plastic accumulation until the soil was reached (see pictures in sup. data). Samples were stored in plastic bags of 50 L. They were dried at ambient air for days, then sorted and counted one by one in the lab, classified by size and category, and weighted.

### 2.1.3. Classification method

Plastic items were classified according to OSPAR and MSFD classifications usually applied to marine environment and to macroplastics > 2.5 cm. Here, when possible, those classifications were also applied to items 0.5 cm < mesoplastics < 2.5 cm. They were separately numbered in the table but weighted together with macro-items. Only industrial pellets were numbered as microplastics (< 0.5 cm). Size class were determined based on at least one dimension.

## Acknowledgments

We acknowledge the lab Polymères, Biopolymères et Surfaces UMR 6270 CNRS from the University of Rouen for their technical support and access to lab facilities. We also thank PhD students Naila Bouhaidar and Bassidi Diawara for their precious help for sorting and counting items. We also thank the Ministry of the Environment of France for its financial support.

## Transparency document. Supporting information

Transparency data associated with this article can be found in the online version at <https://doi.org/10.1016/j.dib.2019.01.045>.

## References

- [1] A. Bruge, C. Barreau, J. Carlot, H. Collin, C. Moreno, P. Maison, Monitoring litter inputs from the Adour River (Southwest France) to the marine environment, *J. Mar. Sci. Eng.* 6 (2018) 24–36. <https://doi.org/10.3390/jmse6010024>.
- [2] T.M. Karlsson, L. Arneborg, G. Broström, B.C. Almroth, L. Gipperth, M. Hassellöv, The unaccountability case of plastic pellet pollution, *Mar. Pollut. Bull.* 129 (2018) 52–60. <https://doi.org/10.1016/j.marpolbul.2018.01.041>.